SALT WEATHERING HAZARDS by Andrew Goudie and Heather Viles, Wiley, Chichester, 1997. No. of pages: xi+241. Price: £39.95 (hb). ISBN 0-471-95842-5.

When I was a research student at Bristol, I presented a paper at a BGRG meeting on the relative importance of solutional, biological and abrasional processes in the marine erosion of limestones on Aldabra Atoll. A confident young man from Oxford who I had not previously met asked if I thought that salt weathering was important. Hastily, I replied that I didn't know, but I thought that it could be. He turned out to be Andrew Goudie; nearly 30 years later, we now know that salt weathering could be important, and current research students should automatically assume that it is probably very important. This is certainly clear from this book. Some 950×10^6 ha of the land of the world is recorded as being salt affected. This poses a 'slow, creeping hazard' for human buildings, other artefacts, and livelihoods in these salt-affected areas. Either through concentration, by evaporation, or because of a rapid rate of supply, many landforms in coastal, arid and semi-arid regions are influenced or even dominated by the effects of salt weathering; salt efflorescence is also recorded from other environments (including when weathering by road salt affects structures in cold regions). The raising of water tables as a consequence of deforestation, the associated decrease in evapotranspiration, and increasing irrigation, are also cited as anthropogenic causes of increased salinity.

In the book, soil salinity is covered as a background to the study of the weathering of structures erected on such soils, rather than in an agricultural context. There are numerous case studies illustrating the effects of such salt weathering, and the complexities of the processes are evident; numerous salts are involved, and they may act together in a synergistic way. The susceptibility of the material is also important, including factors such as porosity and mechanical strength. However, one is left with several feelings about problem areas. One is that there are few general rules, as the combinations of factors are many and it is difficult to say that any one salt, or combination of salts, is the most effective, or that any one rock is the most susceptible. There are many observations, but little theory, indeed the authors conclude that 'the unco-ordinated nature of much of the experimentation makes inter-comparisons difficult and seriously hinders scientific progress in the field'. Another problem is that quantification of the processes, rates and effects is difficult. The rocks may change in volume, disintegrate and fragment into a variety of sizes. Thus, unlike the subaerial weathering of limestone where the acidity of rainfall, surface lowering rate and solute output can be measured and related, salt weathering is difficult to measure. How do you quantify surface lowering when there is no 'clean' surface to measure but an expanding and disintegrating rock mass?

There is also the difficulty of making clear management recommendations. The authors feel that there are no 'quick fix' solutions, but rather long-term environmental management challenges. There is also the problem, which in fact is common to all weathering studies, that many processes operate together, including chemical, biological and frost action in conjunction with salt weathering. Their effects may be mutually reinforcing, mutually exclusive or independent. Sorting out the variety of separate and synergistic effects remains a substantial challenge to weathering studies and it is perhaps only by combined experimentation that the whole picture can be established.

This book could be criticized for being descriptive and merely a compilation of case studies lacking in theoretical basis. However, it is a masterful coverage of available knowledge, and indeed accurately reflects the state of a subject which is descriptive and fragmented. The book provides a comprehensive bench mark of all that is known to date on the nature of the salts involved, material susceptibility, the mechanisms of attack, geomorphological implications and evaluation of hazards. As such it will provide an encyclopaedia for students of weathering and research workers.

The book shows that the answer to the question 'don't you think salt weathering could be important?' is a resounding 'yes'. However, the authors now lay down a clear challenge for future generations of research students. They write: 'it would be exciting to see increased co-ordination between different types of experiment so that we may learn more about the chemical and physical effects of salts in co-association with a range of other weathering processes under different environmental conditions'. The challenge is therefore to provide a theoretical framework of how these processes interact!

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GIS-BASED SOIL EROSION MODELLING IN NW-SWITZERLAND – EROSION DAMAGE MAPPINGS AND MODELLING RESULTS by Dietrich Dräyer, Physiogeographica Vol. 22, Basel, Switzerland, 1996. No. of pages: xxviii+234. Price: SFr. 30 (pb). ISBN 3-85977-221-X.

The international perception of publications written in what Mark Twain has called 'the awful German language' is – quite naturally – of concern to many people in the German scientific community. In the latest volume of 'Physiogeographica', the author, Dietrich Dräyer, attempts to overcome linguistic barriers by providing chapter summaries in English. In addition, most figures and tables are bilingual (although some are in only English or German). Provided that chapter summaries do indeed refer to all of the critical points mentioned in the original text, and guide non-German-speaking readers through the figures and tables, this appears to work well and could serve as a model for others.

The aim of the study documented in this book was to develop a GIS-based application package for the prediction of soil erosion, in an area where ephemeral gully erosion (initiated by interflow during low-intensity winter rainfall) accounts for most of the amount eroded. Ephemeral gully erosion is one of the key topics in current soil erosion research. Unfortunately, the book gives the impression that the author did not realize this, or did not realize that he was dealing with ephemeral gully erosion rather than hillslope rill erosion. Only this can explain why key publications concerned with (modelling) ephemeral gully erosion are missing from the reference list.

The author first uses GIS-based relief analysis and digital elevation models to predict areas of erosion and deposition and, according to him, the results fit well with field observations documented in maps of soil erosion damage. Unfortunately, no quantitative comparison (using GIS) was carried out, on the grounds that it would have been too laborious (p. 112). Thus, it is left to the reader to judge the similarity of the results from maps which are presented in different scales.

Secondly, two 'physically based' soil erosion models (from Germany) were used to model runoff and soil erosion in the valley bottom. Neither of them produced 'results which are accurate enough' (cf. p. 214) – whatever this may mean. While the results do not necessarily discredit the models used, they do clearly highlight the importance of a very basic truth concerning modelling: 'wise use of prediction technology . . . requires that the user be aware of the procedure's limitation' (Renard *et al*., 1991, p. 31)!

Reference

Renard, K. G., Foster, G. R., Weesies, G. A. and Porter, J. P. 1991. 'RUSLE – Revised Universal Soil Loss Equation', *Journal of Soil and Water Conservation*, **46**, 30–33.

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